

DISTRIBUTION SYSTEM ACCESS FOR EMBEDDED GENERATORS - SCOTLAND

PR-NET-EMB-026	Distribution System Access for Embedded Generators - Scotland		Applies to	
			Distribution ✓	Transmission
Revision: 4.01	Classification: Public	Issue Date: May 2025	Review Date: May 2028	

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1 Introduction

- 1.1 At Scottish Hydro Electric Power Distribution (SHEPD), our skilled teams operate and maintain our electricity distribution network, carrying electricity to homes across the North of Scotland. The demand for and use of electricity is constantly changing and at SHEPD we are dedicated to delivering the network and operational changes necessary to transition to a smarter and more flexible Distribution System.
- 1.2 SHEPD's operational teams are responsible for keeping the lights on. If we find a fault, it is our responsibility to respond to the fault and dispatch our skilled teams to fix it as quickly as possible. Where it is safe to do so, we work at all hours and through difficult conditions to keep the lights on for our customers.

2 Background

- 2.1 As a regulated business, we are obliged to manage our distribution network safely and securely while ensuring compliance with all relevant legal and regulatory obligations, standards and guidance. Consistent with this, this policy sets out how we manage generation connected to our network during outage conditions and what this means for you, as a distribution energy resource customer

3 Key Industry Parties

- 3.1 The Distribution Network Operator (DNO): Scottish Hydro Electric Power Distribution (SHEPD)
 - 3.1.1 SHEPD owns and maintains the 33kV and 11kV high voltage electricity distribution network in the North of Scotland and, as at May 2020, we have over 1,000 generators connected to the network. This policy document is applicable to those generators connected to the SHEPD network. Generators connected to the SHEPD network have an Embedded Generation Connection Agreement (EGCA). Every generator connected to the SHEPD network with an EGCA will have a non-firm network connection, unless stated otherwise. There are some cases which may override parts of this policy which include but are not limited to:
 - Generators that have an export limitation, referred to as special conditions, listed within their EGCA
 - Generators that have a Constraint Managed Zone (CMZ) contract to support the network in specific conditions
 - Generators that are operating as part of an islanded network

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3.2 The Transmission Owner (TO): Scottish Hydro Electric Transmission (SHE Transmission)

- 3.2.1 SHE Transmission owns and maintains the 132kV, 275kV and 400kV electricity transmission network in the North of Scotland. SHE Transmission will only have connection agreements in place with generators connected at 132kV or above in the SHEPD/SHE Transmission area. SHE Transmission may have some constraints on its network, often referred to as transmission constraints, that may require upgrading works to remove these constraints as part of a Transmission Owner Reinforcement Instruction (TORI) before more generation can connect on the SHEPD network at 33kV or 11kV. Your connection may have been dependent on a Transmission Reinforcement and, if this is the case, the TORI will be listed in your statement of works. You may have been connected in advance of completion of Transmission works on a non-firm basis, if this is the case you may be subject to a higher volume of outages than other generators while the reinforcement works are taking place.

3.3 National Grid Electricity System Operator (NGESO)

- 3.3.1 NGESO, or National Grid, operates the transmission network across the whole of Great Britain and ensures that, minute by minute, electricity demand is matched by an equal volume of electricity generated. In this role, they are known as the System Operator (SO). For those generators connected at 33kV or 11kV in the North of Scotland that have a capacity of more than 10MW, they are classed as an Embedded Exemptible Large Power Stations (EELPS) under the Grid Code. All EELPS will have a direct contract with National Grid and may receive outage notifications from National Grid relating to activity on the National Transmission system as part of those contracts. This policy relates only to outage notifications issued by SHEPD under a generator's EGCA contacts; SHEPD is not party to contracts between EELPS sites and National Grid.

4 Types of Outages

- 4.1 Outage conditions occur when sections of the network require to be, or are automatically, de-energised. This can be due to either:
- planned situations, for example, where SHEPD or SHE Transmission has a requirement to reinforce, refurbish, maintain or develop the Transmission and Distribution networks, or to establish new connections; or
 - unplanned situations, for example, where the network experiences a fault.
- 4.2 It is not always safe to carry out planned tasks in a 'live' environment and therefore SHEPD have to consider whether outages are required to allow sections of the network to be de-energised in order for works to be carried out safely. When network faults occur, this often causes sections of the network to automatically de-energise. Once the network has been restored, further defect repairs or maintenance may need to be carried out to ensure system security, and that might result in short-notice planned outages. SHEPD will take all reasonably practicable steps to ensure the impact of any planned or unplanned outage is minimised.

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- 4.3 SHEPD will endeavour to undertake planned outages when there is a reduced system security risk and lower demand, generally in the summer as dictated by clock change. It must however be appreciated that this may not always be possible, and generators may be affected by planned outages out with these dates. This may be due to, but not exclusive to:
- Contractual requirements dictating outage dates
 - Environmental restrictions
 - 3rd party requirements
 - Urgent network repairs

5 What is a Generation Constraint?

- 5.1 During outages, we manage the network to redirect the flow of electricity to ensure that customers and generators remain connected. However, in some cases, we may be required to limit a generator's export capacity to ensure that the network continues to operate safely and securely. Where limits around export are placed on a generator, this is referred to as a 'generation constraint'. Generators are notified of a 'generation constraint' by email via the 'Customer Outage Portal' issued by SHEPD. SHEPD will always try to avoid constraining generators, however under the terms of the Distribution Code and clauses within your EGCA, SHEPD can issue a generation constraint notification at any time.

6 How Generation Constraints are Applied

- 6.1 To help ensure SHEPD maintains a safe and reliable network under outage conditions, we will manage generation either through static constraint management or through dynamic constraint management, these terms are defined in section 6.2 and 6.3 of this document.

6.2 Static Constraint Management

- 6.2.1 Static constraint management occurs where all affected generation is constrained to the same maximum export capacity. In some cases, especially where generation is disconnected from the main integrated network, export capacity may be constrained down to zero kW. Importantly, static constraint management does not utilise network studies to determine if there is any additional, site-specific capacity available for generation during an outage. Instead, export capacity is based on levels that are known to permit the safe operation of the network across all geographical locations and conditions, without the need for site-specific system studies or analysis.
- 6.2.2 We will apply static constraint management where:
- The estimated outage duration is 1 day or less, or
 - Where the redirected flow of electricity is to a Grid Supply Point (GSP) that is constrained. GSPs are the points where power is delivered from the transmission system to either a distribution network or a customer connected directly to the transmission system. A constrained GSP is one that has no available capacity, or
 - A generator cannot operate in voltage control mode

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6.3 Dynamic Constraint Management

- 6.3.1 Dynamic constraint management can be undertaken when additional network studies are carried out to allow SHEPD to model the specific impact that embedded generation has on the network when it is exporting, and power flow can be redirected through a different network route during an outage. The result of the study will show where there is capacity available to each generator. When generation can be moved between GSPs as part of dynamic constraint management, a network study will also be carried out by NGESO to assess the impact of the movement of generation on the wider Transmission system.
- 6.3.2 We will apply dynamic constraint management where:
- Estimated outage duration is 2 days or more; and
 - No conditions listed in section 6.2 apply
- 6.3.3 Network studies will only be carried out in line with section 6 of this document and will not be carried out as a result of individual requests.

6.4 Variations

- 6.4.1 To enable a greater volume of generation on to the distribution network while outages are taking place and generators are feeding abnormally the below variations are in place
- No constraints will be issued in planning timescales for outages that only impact generators with a contracted capacity of less than or equal to 300kW. Should network issues occur during the outage the SHEPD control engineers may issue constraints.

7 How Generation Will be Shared Under Dynamic Constraint Management

- 7.1 In Spring 2020, SHEPD consulted with stakeholders on its policy for access to its distribution network, specifically on the potential options for sharing generation output when dynamic constraint management is applied. The consultation along with its responses can be found on the SSEN website.
- 7.2 Under dynamic constraint management conditions, generation will be managed on a pro rata percentage basis. This means that available capacity determined by the dynamic constraint management studies can be shared between all generators affected by the outage according to each individual generator's share of total contracted capacity. This means that each generator will be curtailed to the same percentage of their maximum contracted export capacity. When new generators connect to an export route already utilised by other generators, the percentage of available capacity will decrease for all those generators.

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8 What Happens if You are Unable to Use the Capacity You Have Been Given

- 8.1 Through SHEPD's consultation, it was highlighted by stakeholders that during some outages, where either static or dynamic constraint management is applied, a generator may be unable to use the capacity allocated to them by SHEPD during an outage. Affected generators can:
- 'Hand back' their assigned capacity to SHEPD for this to be shared between other impacted generators; or
 - Share their total assigned capacity between generation sites that they own or operate. The process for this is detailed in Appendix B

9 Notification if Generation Constraints

9.1 Notification of Planned Outages

- 9.1.1 Generators will be notified of planned outage constraints by email as soon as possible and SHEPD's Distribution Outage Planning team has assessed which generation sites will be impacted. The generation constraint notification will include:

- Constraint reference number
- Site name
- Date and time of the constraint
- Constraint value
- Description of the works to be carried out during the outage

- 9.1.2 Where static constraint management is being applied, the notification will include the maximum export capacity permitted for the named site during the outage.

- 9.1.3 When dynamic constraint management is applied, maximum export capacity permitted will be stated as 'To be Advised (TBA)'. The notification will be sent prior to network studies being completed to give generators as much notice as possible of the outage. The notification will be reissued to include the maximum export capacity following completion of the network studies; our commitment is to do this as soon as reasonably practicable up to four weeks ahead of the outage start date.

9.2 Notification of Unplanned Outages

- 9.2.1 Generators will be notified of an unplanned outage by telephone from the SHEPD control room. As detailed in section 4, unplanned outages occur due to real time faults and it is not practical for our control engineers to send emails at the time of a fault. If confirmation of an unplanned outage is required by you, then please contact distributionoutages@sse.com who will be able to provide written confirmation.

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9.3 Notification of Outage Completion

- 9.3.1 On completion of a planned or unplanned outage, SHEPD's control room engineers will contact you to confirm that works are completed and that the generation constraint on your site is now removed. This will apply to both static and dynamic constraint management events/conditions.

9.4 Site Contact Details

- 9.4.1 It is the responsibility of the generator to ensure that SHEPD has the correct contact details for the site. For any site, we can, with permission, hold:

- A single 24-hour contact number
- A single day time telephone number
- Two email addresses

- 9.4.2 The Distribution Outage Planning Team can be contacted to update this information via email: distributionoutages@sse.com

10 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	Original Document created	N/A	1.00	Richard Gough
02	Section 6.2.2-changed the estimated outage duration to 4 days or less. 6.3.2-changed to Estimated outage duration is 5 days or more. 9.1.3-amended wording.	PR-NET-EMB-026 (Rev 1.00)	2.00	Richard Gough
03	Section 6.2.2-changed the estimated outage duration to 3 days or less. 6.3.2-changed to Estimated outage duration is 4 days or more.	PR-NET-EMB-026 (Rev 2.00)	3.00	Richard Gough
04	Section 6.2.2-changed the estimated outage duration to 1 day or less. 6.3.2-changed to Estimated outage duration is 2 days or more. Section 9.3-changed to remove contact by telephone Section 6.4 added – outages that impact 300kW generators Moved to new template	PR-NET-EMB-026 (Rev 3.00)	4.00	Brian Morrissey
05	Section 5.1-Changed to advise outages will be notified via the customer outage portal	PR-NET-EMB-026 (Rev 4.00)	4.01	Brian Morrissey
06				

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Appendix A Frequently Asked Questions

1. As a generator, can I receive financial compensation when I am constrained by SHEPD?

Where generators are connected under a non-firm connection agreement, there is no mechanism in place for generators to reclaim any financial loss incurred for an outage constraint and SHEPD will not be liable for any loss incurred.

2. I am not sure if I have any export limitation special conditions in my EGCA how do I find out?

Special conditions can be found in section 28, which is the schedule of connection details, within your EGCA. This can be discussed with either the outage planning team or your connections account manager to help you understand if there are any export limitations and what this means for your generation site.

3. Can I pay for a study to be carried out if the outage does not fall under the scenarios given?

No. Unfortunately, SHEPD cannot study outages outside the detail provided within this document.

4. If I opt to carry out maintenance to my generation scheme and notify SHEPD of this during a constraint, could my capacity be distributed by SHEPD to others?

Yes, the process for doing this is detailed in Appendix B.

5. My generation site is connected under a flexible connection. Is the policy applicable to me?

All flexible connection schemes have specific contractual arrangements, and this policy will not supersede any of these. Anyone with an flexible connection that is unsure should get in touch via distributionoutages@sse.com to discuss the specifics of their connection arrangement and how this interacts with the policy.

6. When my generation export is redirected on to the distribution system, it is still exporting to the same Grid Supply Point. Does this policy apply to me?

Yes, the policy applies to all connected generators. There could be constraints on the 11kV or 33kV network and a study would be required to determine if the redirected circuit has any available capacity.

7. I have a flexible connection, when a generator is redirected on to same part of the network, I am connected to will I see a higher level of curtailment?

No, flexible connections on their normal export route will remain in the same queue position and will not be impacted by any generator connected to alternative export route

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Appendix B Capacity Sharing Request

If you are issued a generation constraint notification and you do not wish to use all of the capacity assigned to you, please complete the below request and send to distributionoutages@sse.com within 5 working days of receiving the constraint notification.

Hand Back Request	
Site Name:	
Assigned Capacity:	
Outage Start date:	
Reference number:	
Capacity to be handed back:	
Reason for Hand back:	

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If you are issued a generation constraint notification for more than one site that you own or operate, for the same outage, and you would like to move the total assigned capacity between these sites, please complete the below request, and send to distributionoutages@sse.com within 5 working days of receiving the constraint notification.

Sharing Request	
Site 1	
Site Name:	
Assigned Capacity:	
Connected Voltage:	
Outage Start date:	
Reference number:	
Requested New Capacity	
Site 2	
Site Name:	
Assigned Capacity:	
Connected Voltage:	
Outage Start date:	
Reference number:	
Requested New Capacity	
Site 3	
Site Name:	
Assigned Capacity:	
Connected Voltage:	
Outage Start date:	
Reference number:	
Requested New Capacity	
Reason for Sharing:	